The Cary Arboretum

of The New York Botanical Garden

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Dr. Willard Payne to be Arboretum Director

Dr. Willard Payne, Director of the Division of Biological Sciences at the University of Florida, has been named Director of the Cary Arboretum, the environmental and plant science center now being developed by the New York Botanical Garden in Millbrook, New York. He will assume his new duties July 1.

The announcement was made by Dr. Howard S. Irwin, President of the New York Botanical Garden, who has acted as director of the Arboretum since its establishment in 1971 with a gift of land and funds from the Mary Flagler Cary Charitable Trust. Dr. Irwin said that Dr. Payne will also be a vice-president of the Botanical Garden. George Bookman, who has been executive administrator of the Arboretum for the past 18 months, will continue to serve in that capacity and also as a vice-president of the Garden, responsible for public affairs at its Bronx headquarters as well as in Millbrook.

Dr. Payne earned his Master's degree in 1957 from Ohio University and a Doctorate from the University of Michigan in 1962. He has served as an official of the National Science Foundation in Washington, D. C., and as a research botanist and a teacher of botany at the Universities of Michigan, Illinois, and Florida. Most recently, he has directed a division at the University of Florida which includes four departments: botany, biochemistry, microbiology, and zoology. The division currently enrolls 1,500 students each quarter.

When he served at the National Science Foundation as Associate Program Director in 1969-1970, Dr. Payne laid the foundation for its present programs to support biological research resources. He was co-author of a national plan for the Association of Systematics Collections. He also has been awarded a series of research grants by the National Science Foundation starting in 1962. His fields of research include structure and evolution of pollen walls, the characteristics and biology of ragweed plants, and development of plant breathing pores or stomata. He is co-author or editor of a number of scientific books, including a popular textbook on general botany.

Dr. Willard Payne – New Director of Cary Arboretum.

Dr. Payne is president-elect of the American Association of Plant Taxonomists and has held high office in the Botanical Society of America. A native of Hastings, Michigan, and 43-years-old, he is married to the former June Mary Barr. They plan to reside in the Millbrook area.

In announcing the appointment, Dr. Irwin commented:
"The Arboretum has now reached the stage of its development where it requires a scientist at the helm as a full-time resident director, to shape its future programs and to represent the organization in the community. We have been searching for such a person for more than one year. I believe we have found the ideal director in Dr. Payne. His professional accomplishments and his extensive administrative talents, combined with his broad contacts in the world of science, will be a tremendous asset to the Arboretum."

Cary Arboretum Opens to Visitors

Millbrook, New York . . . The Cary Arboretum announced that it will be open to visitors every Wednesday afternoon from 1:30 p.m. to 4:30 p.m. beginning May 11. No advance reservations will be necessary.

Dr. Howard S. Irwin, President of the New York Botanical Garden, which operates the Arboretum, said the establishment of a regular visiting day is a milestone in the progress of the Arboretum.

"It takes many years to develop a collection of woody plants and accompanying research programs. However, the Arboretum is now at a stage of growth where it is ready for regular public visitation. This is in keeping with our philosophy of offering the community opportunities to know and understand the work of the Arboretum," Dr. Irwin said.

The Arboretum is being developed as a major center of plant science, environmental research, and education in plant-related subjects. Its 2,000 acres of rolling fields and woodlands and funds for basic development and operation have been provided by the Mary Flagler Cary Charitable Trust.

Tours begin at the greenhouse-nursery area on Route 82 just north of the State Police Barracks. A volunteer Arboretum guide will lead visitors through this horticultural center, consisting of two greenhouses, irrigated nursery fields, a cold storage building for maintaining plants in winter dormancy, and a lath house that provides shade for tender, young plants.

After visiting the greenhouse-nursery area, visitors are welcome to participate in a self-guided tour of the remaining points of interest lying on the 2,000-acre Arboretum grounds.

The new public tours have been planned and coordinated by Dr. Peter Dykeman and Robert Hebb, both Arboretum staff members. There will be a charge of $1.00 for adults and $.50 for children and senior citizens. Admission is free to members of Friends of the Cary Arboretum.

Corner-Block Ceremony to be Held May 7

Invitations have been mailed to all Friends of the Arboretum and other special guests to attend ceremonies Saturday, May 7, when a bronze and wood corner-block will be placed in a wall of the solar-heated Plant Science Building now under construction on Sharon Turnpike. The program will start at 11:30 a.m.

The principal speaker will be the Honorable Peter A. A. Berle, New York State Commissioner of Environmental Conservation. Dr. Howard Irwin, president of the New York Botanical Garden, Mr. Herbert Jacobi, a trustee of the Mary Flagler Cary Trust, and Mr. Donald J. Bruckmann, new chairman of the Board of Managers of the NYBG will also take part in the program.

The elegantly designed corner-block (chosen to be more in keeping with the Arboretum's concern with trees than the customary cornerstone) was created by Kappy Wells, a New York City sculptress. Her father, Malcolm Wells, is the architect who planned the innovative solar-heated headquarters building for the Arboretum. Mr. Wells is well-known in architectural circles as an exponent of environmentally-designed structures which not only conserve energy, but also – in his words – are "gentle to the land."

Guests are invited to bring picnic baskets and stay for an "al fresco" lunch that will follow the ceremony. Tables, chairs, and light beverages will be provided. After lunch, members of the staff will lead tours of the Plant Science Building construction site and other points of interest on the Arboretum grounds.

Dramatic progress has been made since construction began about a year ago. Visitors to the site now will see the building beginning to take on its permanent impressive appearance. Geometrically designed beams rise majestically above ground, with a hemlock glen as a natural backdrop. Atop these beams is the roof decking which will support seven southward-facing solar panels. Inside the unique structure carpenters, plumbers, electricians, and laborers have been diligently transforming the 28,000 square feet of floor space into viable working areas. Completion is expected later this year.

A Building With a Purpose

The Plant Science Building of the Cary Arboretum symbolizes in every aspect of its design and construction the Arboretum's commitment to sound environmental principles.

The site itself was chosen with such considerations in mind – the building nestles against deep woodlands and is sheltered by a range of small hills. Quite literally, the structure has been placed into the earth – about two-thirds of it being underground – insulated against both wintry winds and summer heat. Energy from the sun is harnessed to provide most of the heat in the building by means of rooftop solar collectors, supplemented by a heat pump. Water from deep artesian wells is used to cool the interior of the building for summertime air conditioning. Throughout the structure, a variety of special systems is utilized both to conserve heat and natural resources and to minimize energy consumption. The building truly reflects its purpose as the administrative headquarters and laboratory facility for the Cary Arboretum, a branch of the New York Botanical Garden.

The most striking feature of the building is its array of seven rows of flat, black, glass-covered boxes in a sawtooth pattern on the roof. These are the solar collectors that absorb the sun's energy and convey its heat to the interior of the building. Each south-facing row is 110 feet long, 7 to 8 feet high, and is inclined 30° from the vertical to absorb maximum energy from the winter sun.

The sun's energy warms a thermal fluid (water mixed with antifreeze) that circulates inside the collectors. This heat is then transferred by means of a heat exchanger to water that is stored in two heavily insulated underground concrete tanks with a total capacity of 15,000 gallons. The hot water is released from these tanks into a series of heating coils, fans blow air over the coils, and it is this warm air which actually is circulated through the ducts in the building.

Two types of collectors are used on the building, with provision made to monitor the performance of each type separately. This provision will have operational considerations, but the data collected also will make an important scientific contribution in this rapidly developing area of applied ecological engineering.

The four southernmost rows are made of 3 feet by 7 feet sections of conventional flat plate collectors, consisting of two layers of tempered glass cover-plates set against black steel absorber plates. The antifreeze solution circulates through passages between the welded absorber plates. These four rows of collectors are products of the Chamberlain Manufacturing Corporation of Chicago, Illinois.

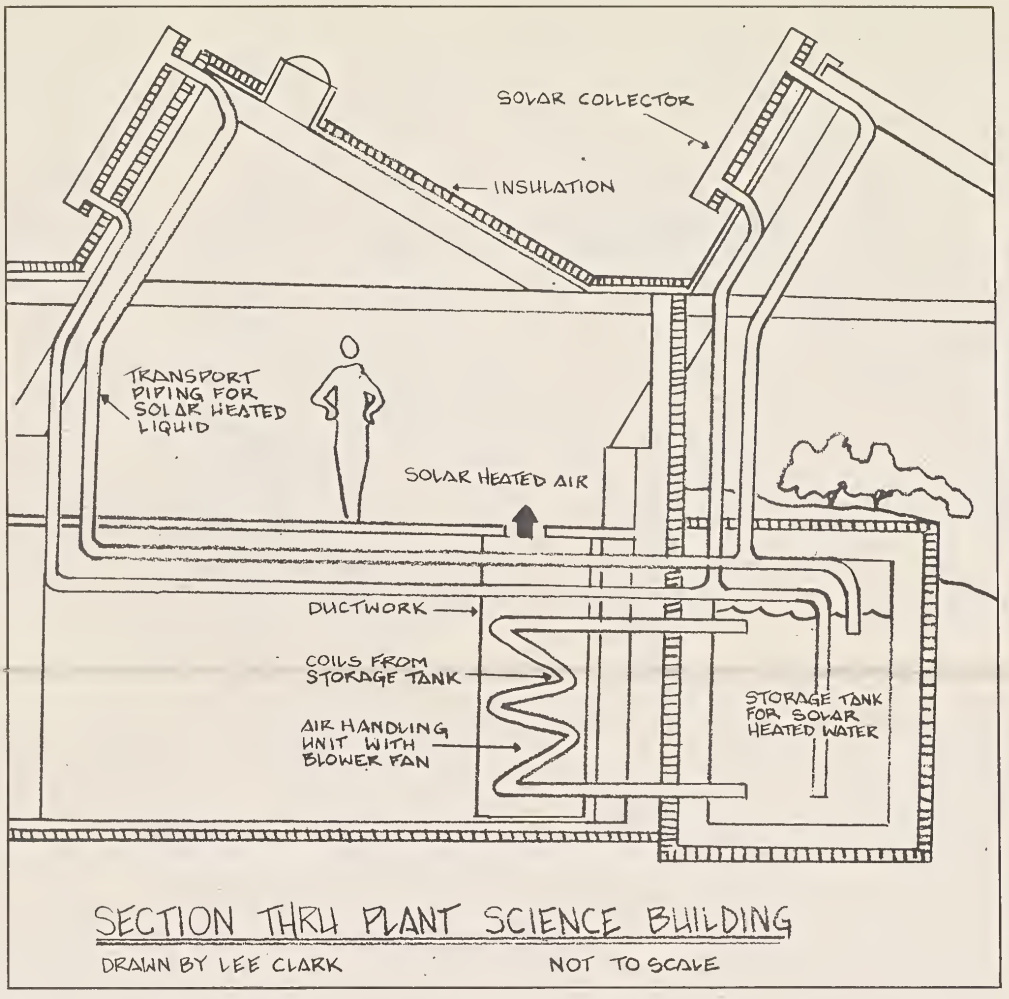
The three northerly rows, composed of sections that are 5 feet 3 inches by 8 feet, operate on a different principle. The fluid flows through horizontal copper tubing, etched black, which in turn is encased in two concentric glass tubes. A silver coating on the back side of the inner surface of the larger glass tube acts as a reflector, focusing and concentrating heat in the copper tube before it flows into the heat exchanger. KTA Corporation of Rockville, Maryland, manufactures this type of collector.

The total area of the two types of collectors combined is 5,650 square feet.

An important feature of the design is the low temperature (105° F) at which the water can be collected, stored and used in the heating coils. This low temperature permits collection during more hours of the day (especially in mid-winter when the sun is lower in the sky) and also when the sky is not completely clear.

When the solar collectors cannot deliver sufficient heat due to inclement weather, a refrigeration unit that can be used both as a "heat pump" in winter and a chiller in summer takes over to provide a backup

Seven sharp roof peaks for the Cary Arboretum's solar-heated Plant Science Building are now covered with wooden decking, where staff member stands admiring the setting sun.



SECTION THRU PLANT SCIENCE BUILDING

DRAWN BY LEE CLARK NOT TO SCALE

source of heat (or cooling). In the heating mode, the unit pumps heat (extracts heat) from well water at 55° F to boost daytime low-grade solar water or nighttime storage water to maintain the 105° F utilization temperature. The "heat pump" is used in this mode primarily in January and February, when solar energy is insufficient to provide for the building's total heating load. In December, when solar gain is also less than the load supplies, heat stored from the high gain early in the fall makes up the difference.

In the cooling mode, the unit is a true chiller, lowering the cooling system water from the building's deep wells from 55° F to 45° F. In both summer and winter, this unit will also be run at night thus helping the utility to level peak loads while the unit makes chilled water or raises the temperature of water in storage.

The building also contains a standby electric generator for use during power emergencies, and the heat given off through the jacket of the generator will also be recoverable.

The environmental systems in the building are interconnected in such a way as to allow various modes of operation to be selected according to conditions at the time. The automatic control system (manufactured by Robertshaw Controls of Richmond, Virginia) can provide twelve different methods of operation, ranging from use of solar-heated water from either one or two tanks, to solar energy combined with heat from the chiller, or with waste heat from the generator, plus several different modes of cooling. Heat sensors placed throughout the system select the heating mode automatically, but this always is based on the order of priority of minimum energy input.

The environmental design of the building, including its solar-based heating system, is intended to reduce its requirements for outside energy by 35%, as compared to a conventional structure. The solar system is designed to provide an estimated 85% of the heating requirements of the building, with the balance furnished by the chiller acting as a heat pump.

The guiding principles of saving energy and conserving resources are embodied in many other features of the building. The outer surfaces of the entire structure, for example, are wrapped with thick layers of insulation board under hard weather-resistant coating. This enables the concrete mass of the foot-thick walls to act during the winter as a "heat trap," absorbing heat during the daytime from the heating system and returning it to the interior of the building at night.

Twenty-eight skylights are placed in the roof to admit light and the warmth of the sun during the day, but on winter nights these skylights can be sealed against heat loss by means of insulated cover panels inside the building that are rotated into place by the turn of a crank.

Every precaution is taken to conserve heat: windows are fully weatherstripped, all outside structural joints are tightly sealed, and 100% return air is used to condition the building when it is not occupied, thus performing a double function. Windows are double-glazed, also for insulation, and can be shuttered at night to prevent heat escaping through the glass.

The coldest sides of the building, those facing north, east and west, are protected by earth embankments and have small window openings. On the southern side, windows are generous in size to admit warmth and light, but are shielded from the summer sun by means of overhangs. A distinctive feature of the structure is the partially enclosed courtyard – or atrium – facing east, again to admit light and solar warmth but also to provide protection from chill winds.

Recycling is also part of the building's design. For example, heat from warm exhaust air from the fume hoods in the research laboratories is captured by means of heat recovery coils and reused with heat exchangers to preheat incoming make-up air. Rainwater is collected on the roof and used for such purposes as irrigation, flushing toilets and fire protection.

Warm process water from the air conditioning systems is discharged back into the ground from the cistern overflow where, by filtering through layers of gravel, it is cooled and returned to the aquifer for reuse.

Air in the ventilation system will be circulated in varying volume and mix, depending on the needs of different rooms. During hot weather, all the air in the building will be flushed out at the end of the day and replaced with cool night air, thus saving work for the air conditioning machinery.

Energy is carefully conserved in the office areas by means of a task-lighting system that focuses bright light only on desks and other work stations, with lower-intensity light elsewhere in the building. Light colors predominate in the decorating scheme to make maximum use of the illumination.

Concrete and wood, the two basic materials used in construction, are the dominant motifs of the interior. Massive roof timbers of Douglas fir rise dramatically from desktop level to form the seven parallel ridges of the rooftop collectors. The building's concrete mass also provides the surface of most of the interior walls.

In its 27,400 square feet of floor space, the Plant Science Building contains nine laboratories for research scientists working in the fields of dendrology, taxonomy, genetics, morphology, ecology, plant pathology and wildlife biology, as well as work space for horticulturists and other specialists. It also houses a library, herbarium, administrative and business offices, and an experimental greenhouse attached to its south wall. There are conference rooms for scientific meetings and other events, and a public reception area to be equipped with displays.

The architect for the unique structure is Malcolm B. Wells of Cherry Hill, New Jersey. Fred Dubin of Dubin-Bloome Associates, West Hartford, Connecticut, designed the heating, plumbing and electrical systems. Enis Y. Baskam, Hicksville, New York, is the structural consultant. Interior design is by Interspace, Inc., of Philadelphia, Pennsylvania; site planning by Environmental Planning and Design, Pittsburgh, Pennsylvania.

The general contractor is John Lowry, Inc., of New York City. A number of Dutchess County firms have participated as major subcontractors, including R. Ciferri and Sons of Millbrook (concrete and masonry), C.B. Strain & Sons, Inc., of Poughkeepsie (mechanical work); Louis Daniele, Inc., of Millbrook (sitework); and Wiltse Bros. Inc., of Poughkeepsie (excavation). Manager of the project for the Cary Arboretum is Daniel F. Brown. James Scott is Clerk of the Works.

How to Revitalize Your House Plants

By Bonnie Fiero, Gardener in Charge of Greenhouses

Spring, a time of rebirth for perennial plants, also is a time of renewal for the gardener who is eager to work outdoors. But don't make the mistake of neglecting indoor plants at this time of year! After a long winter, they also need attention, and now is the time to revitalize them.

The way to start such a revitalizing program is to carefully inspect your house plants to see if they look healthy. If they do not look "up to par" and yet show no signs of insect or disease damage, the plant should be "tapped out" of its pot to see what's going on inside.

Tapping a Plant from a Pot:

(1) Place your hand over the pot, putting your fingers on each side of the plant's stem.

Dawn Lange, Arboretum research assistant, is shown tapping out a plant from its old pot.

Turn the plant upside down and gently tap the pot's rim on a table edge. The plant should slide out easily. Tapping out large potted plants requires two people. One person holds the plant's stem at the base, just above the soil, and picks the pot up off the floor. The other person places a piece of wood on the rimmed edge of the pot and taps it with a hammer. The wood helps keep the pot from cracking and chipping.

(2) Examine the root system after the plant has been removed from the pot. Healthy roots are whitish-yellow, while unhealthy ones are dull brown and may indicate an over-watering problem. If you see more roots than soil, the plant is "pot bound" and ready for the next larger pot.

(3) A plant that has a very tight root system which completely covers the soil may need "loosening." With your fingers, pull the roots slightly apart. If the roots are extremely compacted, you may have to slice down through them with a knife in several places. This "loosening" procedure will enable the roots to spread out into the new soil and grow out of their circular pattern.

Repotting:

(1) The first consideration in repotting is to choose the correct size pot. Using the next size larger pot usually works best. Do not "over-pot" or use a container that is too large for your plant, because the excess soil will hold water that can not be actively utilized by the plant. Too much water will tend to rot the root system.

(2) The next step is to move the plant to its new pot. First, place the potting mixture in the bottom so that the plant is raised to the level where it grew in its old container. Be sure to allow at least two inches of pot rim for watering. If the soil is too high, you will be unable to apply a sufficient amount of water in one application. After placing the plant in the new container with its soil still shaped by the old pot, fill in the edges

Loosening the plant roots is often required before repotting.

with new soil, packing it down firmly, but not too hard. The standard recommended soil mixture is one part sterilized "potting soil," one part fine peat moss, and one part perlite or white builders' sand (equal parts by volume).

(3) Watering the plant immediately after repotting is very important. The plant has gone through a shock, and watering will help the injured roots. It will also help settle soil around the root system, driving out any air that may surround the roots.

Remember, one of the keys to healthy house plants is to see what's going on in the root system. Don't be afraid to "get into" your plants!

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